



Supporting the Global War on Terror: a tale of two campaigns featuring the 250th Forward Surgical Team (Airborne)

Robert M. Rush, Jr., M.D.^{a,*}, Neil R. Stockmaster, M.D.^a, Harry K. Stinger, M.D.^a,
Edward D. Arrington, M.D.^a, John G. Devine, M.D.^a, Linda Atteberry, M.D.^a,
Benjamin W. Starnes, M.D.^a, Ronald J. Place, M.D.^b

^aDepartment of Surgery, Madigan Army Medical Center, Tacoma, WA 98433, USA

^bDepartment of Surgery, Landstuhl Regional Medical Center, Landstuhl, Germany

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Abstract

Background: Forward Surgical Teams (FSTs) are 20-person units designed to perform front-line, life-saving combat surgery. This study compares the employment, injuries encountered, and workload of an airborne FST in two widely varying campaigns.

Methods: The 250th FST provided far forward surgery for initial entry assaults and follow-on stability operations in Afghanistan (Operation Enduring Freedom [OEF]) and northern Iraq (Operation Iraqi Freedom [OIF]). Prospective data on all patients admitted to the 250th were analyzed. Data from civil affairs missions were evaluated retrospectively.

Results: In supporting combat operations, 127 surgical procedures (OEF: 68, OIF: 59) were performed on 98 patients (OEF: 50, OIF: 48) during 17 months deployed (OEF: 6, OIF: 11). After initial assaults, stability actions varied significantly in terms of civil affairs missions (OEF: 3, OIF: 161).

Conclusions: Although the number and types of combat casualties were similar between the campaigns, employment of the FST changed dramatically in OIF because of increased medical reconstruction missions. © 2005 Excerpta Medica Inc. All rights reserved.

Keywords: Forward surgical team; Far forward surgery; War surgery; Operation Enduring Freedom; Operation Iraqi Freedom; Airborne operations; Damage control surgery

The battlefield in the Global War on Terror (GWOT) presents a wide foray of combat scenarios to which military surgical assets must respond. Mass casualties from terrorist strikes against civilian and military targets, keeping up with and triaging the injured during lightening fast mechanized assaults on regular enemy forces in Iraq, and providing far forward surgical capability in isolated areas for special forces hunting down guerilla terrorists from the jungles of the Philippines to the mountains and deserts of Afghanistan are but some of the many missions assigned to Army Forward Surgical Teams (FST) [1,2]. The modern FST was

born out of Operation Desert Shield/Storm when traditional mobile army surgical hospitals (MASH) and combat support hospitals (CSH) were found to be too large to be tactically responsive [3]. Those units formed a “slice” or a team with surgical capabilities and sent them forward to support the high-speed mechanized advances until the rest of the hospital could catch up. Doctrinally, the FST is a 20-person, highly mobile, yet robust surgical asset designed to provide life- and limb-saving surgery in the far forward battle area, in austere conditions, 3 to 5 km behind the forward line of troops. The team is designed to support brigade/regimental size combat units and special operations groups for intense periods of fighting. The FST’s primary assets are 2 operating rooms in which up to 42 operative cases can be done in 72 hours, after which it redeployes to the next higher CSH or medical brigade for resupply and rest [4]. During the time of employment, the FST usually co-locates with the medical company/platoon of the combat

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* Corresponding author. Tel.: +1-253-968-2200; fax: +1-253-968-0232.
E-mail address: robert.rush1@us.army.mil

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brigade's forward support battalion, from which it receives its ongoing logistical support and forms a synergistic casualty treatment facility.

Procedures performed at the FST are numerous but all involve an immediate default to damage control philosophy to stabilize the patient and render him or her transportable to the next echelon of medical care, doctrinally no greater than 6 hours after initial operation. Additionally, the FST is selective due to limited resources and in times of overwhelming casualty in-flows must concentrate on saving the 10% to 15% of wounded who would otherwise not survive transport to the CSH in the rear, while at the same time recognizing who cannot be saved. Lesser injured and expectant patients are treated by the co-located brigade medical company or battalion aid station.

This concept of employing FSTs is uncommon when reviewing initial reports emerging from campaigns and non-linear battle areas in Operation Enduring Freedom (OEF) in Afghanistan and Operation Iraqi Freedom (OIF). For the most part, only in the initial assaults from Kuwait to Baghdad, lasting from March to May 2003, were FSTs used in their published role [2]. The 250th FST (ABN) out of Fort Lewis, WA, and the 274th FST (ABN), based at Fort Bragg, NC, were the only two FSTs to see major combat action during the initial assault phases and subsequent stability operations in both Afghanistan and Iraq. The purpose of this study is to describe and compare the employments of the 250th FST (ABN) and demonstrate the unique flexibility of the FST concept in supporting the GWOT.

Methods

OEF involved the use of large numbers of special operations forces (SOF) who teamed up with the militia units of the Afghan northern alliance (NA) to defeat the ruling Taliban and oust al Qaeda terrorists with pin point air strikes and modern infantry tactics, thus liberating Afghanistan. The 250th FST deployed in support of Combined Joint Special Operations Task Force–South (CJSOTF-S) in early October of 2001. The team was staged at Seeb Air Base, Oman from October 20 to December 24, 2001, where it integrated with the Expeditionary Medical Detachment–Surgical (EMEDS) of the US Air Force's 320th Expeditionary Medical Group while waiting for US Special Forces to secure a base deep within Afghanistan for far forward surgical and logistical support. While at Seeb, the hybrid FST-EMEDS facility treated casualties from the initial assaults in the southwestern front and Pakistani border region. On December 25, 2001, the 250th FST moved forward to Kandahar International Airfield (KIA), Afghanistan until April 2, 2002. While in Kandahar the unit provided stand-alone surgical support for the CJSOTF-S (Task Force K-Bar), the 26th Marine Expeditionary Unit (MEU), 3rd Brigade/101st Airborne Division (Air Assault), Coalition Forces, and local Afghan militia. For a brief period on initial entry, the 250th

integrated with the Shock Trauma Platoon (STP) of the 26th MEU and in late February with the forward support medical company of 3rd Brigade/101st ABN (AASLT). All medical units provided varying degrees of support to the theater detainee collection facility also located on Kandahar Airfield. An air force critical care air transport team (CCAT) was assigned to assist with the evacuation of severely wounded casualties.

After redeployment the 250th re-equipped, further modernized, and updated techniques and procedures based on lessons learned from the OEF experience. In late January 2003 the unit was called upon again, this time in support of OIF and the 173rd Airborne Brigade out of Vicenza, Italy. The unit moved to Vicenza just as the invasion of Iraq started in the south where the 2-day, pre-war link up with the 173rd's forward support medical platoon occurred. On the night of March 26, 2003, while the 555th FST out of Fort Hood, TX was supporting the 3rd Infantry Division's drive toward Baghdad in the south [2], echelon one of the 250th FST jumped into northern Iraq with 1000 men of the 173rd ABN BDE to provide drop zone surgical support for the assault on the airfield at Bashur, thus officially opening the Northern Front in OIF. Echelon one consisted of 9 members: 1 general surgeon (commander), 1 orthopedic surgeon, 1 nurse anesthetist, 1 emergency room nurse, 2 emergency medicine technicians, 2 operating room technicians, and 1 licensed practical nurse (team sergeant); 2 heavy dropped HMMWV's (HUMVEE's), and enough equipment to set up 1 operating room tent. Once the airfield was secured, the other 11 members performed a combat air-land operation on the following night to complete the FST. All patients injured in the initial airborne assault were treated by the FST and evacuated via back-loading the air-land aircraft directly to Landstuhl Regional Medical Center in Germany. US Air Force CCAT teams, 3-person teams consisting of 1 critical care physician, 1 intensive care unit nurse, and 1 respiratory therapist, accompanied the casualties to the rear. Initially, the 250th helped support JSOTF-N, consisting of the 173rd, 10th Special Forces Group, and the Kurdish militia. Similar to the initial campaign in OEF, SOF and a limited conventional force, consisting of the 173rd ABN BDE, combined with the Kurdish militia and assaulted the northern oil city of Kirkuk. After Kirkuk's liberation on April 11, 2003, the 173rd quickly initiated a massive civil affairs campaign to rebuild the city's infrastructure and win the hearts and the minds of the people. The 250th integrated with the local surgical community and initiated an array of reconstruction projects, while still providing far forward surgical capability to the maneuver units of the 173rd task force fighting the insurgency until redeployment in March 2004. The unit also worked with 3 rotations of personnel of a small 60-person EMEDS hospital placed at Kirkuk Military Airfield in June 2003 to Mar 2004 for the purpose of strategic and operational evacuation of wounded from the northern regions of Iraq.

The 250th FST's mix of personnel was as follows: 3

general surgeons (1 commander), 1 orthopedic surgeon, 2 nurse anesthetists, 1 intensive care nurse, 1 emergency room nurse, 1 operating room nurse, 1 administrative officer, 1 team sergeant, 3 intensive care licensed practical nurses, 3 operating room technicians, and 3 emergency medical technicians. There are 4 functional areas of the FST to include trauma/triage, operating room, recovery room/intensive care, and a small tactical operations center. Due to stand-alone operations in OEF, 2 additional blood drive lab technicians were added to the team before deployment. Nine members of the team participated in both campaigns. The number of personnel was tailored toward the second half of the OIF tour as mission needs decreased and other assets became available.

We previously reported using a 40-point database to record casualty data prospectively during OEF [1]. This was expanded in OIF to include the mangled extremity severity score (MESS) [5] and serum lactate data where appropriate, results of which will be reported elsewhere. It should be noted that some data from OEF that were previously reported [1] may be repeated here to compare the campaigns. For the purposes of this study, a surgical procedure is defined as any operation for trauma, nonoperative trauma resuscitation, or emergent general surgical operation performed in direct support of combat operations. Also, if a patient had more than 1 major injury requiring 2 teams or stages of operation, the procedures were counted separately. Battlefield evacuation times from the point of injury to operative treatment (TOT) at the FST, recovery times (PACU times), and evacuation times from point of entry into the FST to the time the patient was moved to the next higher echelon of care were recorded, except in the initial phase of OEF when the team was co-located with the EMEDS hospital in Oman because this facility had theater evacuation holding capability. Mechanisms were classified as gunshot wounds (if deemed to be caused by high-velocity rifles), fragment injuries, and non-battle injuries. Fragment mechanisms were subdivided into mine blasts, bomb blasts (dropped from airplanes and artillery/mortar fire), grenade blasts (both hand thrown and rocket propelled), and improvised explosive devices (IED), an injury exclusive to OIF. Injury location was noted as head/neck, extremity, or torso, and in the case of multiple injuries the most serious injury was used. However, in order to perform evaluation of the effects of body armor multiple injury sites were noted, but more than 1 injury to the same location on the same casualty was counted only once. For example, if a soldier was injured in the chest, upper extremity, and lower extremity, only 2 locations were recorded, i.e., torso and extremity.

In OEF, detainee care at Kandahar was performed at a separate facility due to security reasons, and only partly manned by 250th personnel, thus these data are presented separately in summarized form. Data for FST participation in detainee care at KIA are reported as number of days 250th personnel participated and are estimated. Data for civil affairs missions were collected by individual surgeons

and analyzed retrospectively for case variety and numbers, numbers and types of individual missions, and characteristics of major reconstruction projects. For workload purposes, individual missions in support of civil affairs projects were all-day events and were counted in number of days. On occasion, multiple surgeons from the FST participated in a single mission but this is not specified. At no time was the FST's mission of far forward resuscitative surgery compromised by civil affairs actions, as a complete operative team was always immediately available for resuscitative surgery.

The Student *t* test was used to compare TOT, PACU, and evacuation times, as well as for other data in comparing means. Chi-square analysis was used to test the significance of the influence of body armor on injury distribution.

Results

The 250th FST (ABN) performed a total of 127 surgical procedures on 98 patients (OEF: 66, OIF: 59) over a total deployed time of 17 months (OEF: 6, OIF: 11) in direct support of coalition combat operations. Of the 98 patients to undergo surgical procedures in the FST, 60 (OEF: 25, OIF: 35) were US or coalition forces and 38 (OEF: 25, OIF: 13) consisted of civilians, militia (OEF only), and enemy prisoners of war (EPWs) (OIF only). The greater proportion of local nationals treated in OEF was due to the poor state of Afghan hospitals and their inability to care for northern alliance militia. In OIF many of the hospitals in northern Iraq remained open and cared for the brunt of Iraqi civilian and military injuries even in the initial assault phase. One hundred nineteen (94%) surgical procedures were for trauma, and of these 99 (78%) were operative trauma cases and 18 (14%) were nonoperative trauma resuscitations. There were only 2 nonoperative trauma cases in OEF compared to 16 in OIF, demonstrating the differing combat environments: for the initial entry into Afghanistan, only a small support footprint could be moved forward and evacuation routes and times were longer, thus forcing more definitive care at the FST; whereas in Iraq, in-country CSHs became available more quickly, were closer, and thus non-life/limb-threatening injuries were referred there after initial stabilization as per doctrine. Another factor that demonstrates this point is the entry criteria. In OEF 22 (47%) casualties sustained injuries meeting at least one of the 57 specific injury categories in Field Manual 8-10-25(4), in OIF 37 (63%) met the criteria. Entry criteria were less stringent in OEF due to stand-alone employment of the FST, whereas in OIF the unit was consistently integrated with a forward support medical platoon that would care for minor injuries.

Injury distribution patterns versus injury mechanism are displayed in Table 1. The revised trauma score for our total casualty population was 7.2 (OEF: 7.4 ± 1 ; OIF: 7.0 ± 2). Major cases performed included 9 laparotomies (OEF: 6, OIF: 3), 5 external fixator placements (OEF: 4, OIF: 1), 8

Table 1
Injury mechanism compared with injury site for patient primary injury for each campaign

Mechanism	Mechanism totals		Head/neck		Torso		Extremity	
	OEF	OIF	OEF	OIF	OEF	OIF	OEF	OIF
Bomb blast	13	1	4	1	2	0	7	0
IED	0	6	0	4	0	1	0	1
Mine	8	1	1	0	1	0	6	0
Grenade	5	7	1	1	1	0	3	6
Blast subtotal	26 (55%)	15 (35%)	6	6	4	1	16	8
GSW	8 (17%)	17 (40%)	1	1	4	7	3	9
NBI	13 (28%)	11 (25%)	4	5	1	1	8	5
Total	47 (100%)	43 (100%)	11 (23%)	12 (28%)	9 (19%)	9 (21%)	27 (57%)	22 (51%)

IED = improvised explosive device; GSW = gunshot wound; NBI = nonbattle injury. Numbers represent patients. Percentages relate to total number of patients in each campaign.

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amputations (OEF: 6, OIF: 2), and a liberal number of fasciotomies, debridements and washouts. The team performed a total of 7 major vascular cases (OEF: 2, OIF: 5), including 1 brachial fragment embolectomy from a penetrating thoracic fragment wound, 2 reverse saphanous vein grafts for superficial femoral artery injuries, and several simple arterial and venous repairs. Arterial and venous duplex exams were performed during OIF using a handheld portable ultrasound machine. This device was also used to evaluate abdominal injuries using the focused sonogram for trauma examination. Arteriograms were performed on occasion in both campaigns for proximity injuries, injured extremities showing soft signs of vascular compromise and for questionable duplex examinations. There were 2 major thoracic cases, 1 in each campaign. In OEF, 3 patients presented to the FST as killed in action, 2 died of closed head injuries while at the FST, and 1 died from severe chest wounds and multiorgan failure at an evacuation hospital. Four casualties died at the FST or in the brigade triage area in OIF; all were trauma arrests (3 from head injuries, 1 from exsanguination from a superficial femoral artery and vein injury). The only child to present to our unit for trauma died from a closed head injury from a motor vehicular accident at a referring hospital. Blood usage was similar in both campaigns; in OEF 46 units of packed cells were transfused in 9 patients and in OIF 43 units were transfused in 9 patients. Antibiotics were given to all patients requiring a surgical procedure. When analyzing all patients who sustained combat injuries in both campaigns, it was found that the use of body armor decreased the distribution of torso injuries significantly (Table 2).

The average TOT for OIF was 1.5 ± 1.8 hours and was significantly faster than OEF at 6.2 ± 10.2 hours ($P < .05$). In comparing the TOT between doctrinal FST roles and using only the TOT from Kandahar in OEF (2.7 ± 2.7 hours) to compare with that of OIF, the times to operative treatment in Iraq were still significantly faster ($P < .05$). PACU times for OEF (Kandahar phase) were 10.3 ± 20 hours, and for OIF 7.4 ± 11 hours, both longer than the doctrinally accepted 6-hour maximum. Evacuation times

(the time from entry into the FST until evacuation to the next echelon of care) were 28 ± 32 hours for Kandahar in OEF and 36 ± 40 hours for OIF. Long PACU and evacuation times for Kandahar were expected due to the tactical situation, long lines of communication, and weather/terrain conditions. In OIF, there was no detainee facility where medical care could be easily given and no northern theater evacuation plan for wounded EPWs and thus they remained in the intensive care unit or hold area for longer periods of time. Excluding the EPWs from OIF, the PACU and evacuation times were 4.9 ± 5 hours and 22 ± 40 hours, respectively.

Detainee care during OEF was performed at the theater detainee collection point at Kandahar International Airport. Approximately 640 detainees were processed through this facility, of which 135 had significant injuries. The 250th assisted with the ingress of patients on 5 nights, surgical interventions (mainly washouts, debridements, and dressing changes) on 10 days, and egress procedures (delousing, shaving and final examination) on 7 days. Adding the number of days spent at the detention facility to our previously reported surgical workload (1), out of the 180 days deployed, surgeons actually performed patient care on 50 days, and on most days, there was only 1 case or 1 patient per day.

Civil affairs missions accounted for a total of 3 days of

Table 2
Effects of body armor on injury location in all patients with combat injuries

	Head/neck		Torso		Extremity	
	(+)BA	(-)BA	(+)BA	(-)BA	(+)BA	(-)BA
No. of patients	5	9	5	16	17	28
Percentage	19%	17%	18%	30%	63%	53%

All patients from both campaigns who sustained combat injuries were used. Instead of using primary injury site only for distribution, injuries were redistributed based on multiple injury sites. (+)BA = patient wearing body armor; (–)BA = patient not wearing body armor. The difference between torso and extremity injury distribution is significant, $P < .05$.

work in Afghanistan for the 250th. These projects consisted of conducting hospital/clinic site surveys and resupplying war-torn clinics. Further humanitarian aid during the early days of the campaign were limited due to operational and security constraints. Subsequent FSTs and CSHs have expanded the humanitarian efforts in Afghanistan [6].

The civil affairs mission in northern Iraq was initiated soon after the assault on Bashur airfield. Members of the 250th met with local physicians in the Kurdish-controlled regions and established site surveys and informational exchanges. After the liberation of Kirkuk, the mission exploded exponentially. Members of the 250th were responsible for 5 major medical reconstruction projects, shown in Table 3. In support of these projects, the team performed 160 missions, consisting of conveying to the location of the mission, spending the day performing the mission, and then conveying back to Kirkuk Military Airfield. The 250th FST surgeons performed 105 surgeries with local surgeons at 2 local public hospitals. Most surgeries were for hydatid disease (liver 3, lung 3, soft tissue 1, and bone 1), laparoscopic and open cholecystectomies (5), surgical manifestations of tuberculosis (3), and urologic disorders (5). The orthopedic surgeon performed 5 spine surgeries. Our vascular surgeon performed a repair of a tracheoesophageal fistula in a newborn. Surgeons helped re-establish grand rounds at 3 major hospitals in 2 cities, as well as assisting with the formation of the Iraqi-American Surgical Association of Northern Iraq. The team was also put in charge of revamping the emergency medical system in Kirkuk. More than 150 EMTs, ambulance drivers, and emergency room nurses underwent training similar to the Pre-Hospital Trauma Life Support course available in the United States, practiced real-time scenarios, and were then witnessed to quickly respond to the horrific bombing of the Peoples Republic of Kurdistan headquarters in Kirkuk in November 2003 where more than 100 people were injured or killed.

Comments

The employment of the forward surgical team in these 2 campaigns was somewhat similar during initial entry operations on an operational level: far forward surgical support of special operations forces and airborne/expeditionary

units that integrated and led local militia assaults against the ruling tyrannical parties. Because of this there was less need for a large conventional force in Afghanistan and northern Iraq, greatly reducing US and coalition casualties, and thus accounting for the 250th’s limited combat surgical workload. The 173rd sustained only 9 injuries among 1000 paratroopers during the airborne assault on the Bashur airfield. The worst of these were a tibia-fibula fracture and a paratrooper with bilateral dislocated shoulders. Wet conditions on the drop zone afforded the jumpers with a soft landing and the pre-jump drop zone reconnaissance done by special operations forces minimized enemy contact. The airborne forward surgical team is designed to break into echelons for short periods of time to provide far forward combat surgical support of airborne, light infantry, and special operations brigade size task forces striking deep to the enemy’s rear. Theoretically, the amount of time spent separated should be no more than 48 hours. Drop zone surgical care is limited to Advanced Trauma Life Support procedures and stopping the bleeding via the quickest means necessary. These concepts were verified by the deployments of the 250th.

Patterns of injury encountered by the FST were similar in the 2 campaigns, and similar to historical reports except for the low drop zone casualty rate. There were a greater number of gunshot wounds in OIF and this can be accounted for by the more urban nature of the conflict [7]. Fragmentary wounds dominated the OEF casualties partly due to the use of air-dropped munitions, the higher density of mines in Afghanistan, and the special operations–dominated tactics. However, with the expanding use of the IED in Iraq, fragmentary injuries are on the rise.

In the far forward and austere environment of the FST setting, damage control techniques are the default [6]. However, this battlefield damage control concept is markedly different than damage control techniques in the urban civilian setting in present day America [8]. The resources and time involved in saving the patient with multisystem trauma and massive hemorrhage that is often afforded in civilian trauma systems is not present in the far forward area. Many of these patients would be classified as unsalvageable or expectant and it is in the hands of the FST surgeon to have the skills and experience necessary to be able to not attempt futile surgical procedures in a resource- and time-constrained environment. The type and breadth of battlefield damage control usage first involves the sense of knowing where one’s FST is on the battlefield in terms of evacuation assets, the capabilities of both the medics who bring in the casualties from the field and the next echelon of care available, enemy situation, one’s own force protection status, resupply, co-located medical assets, and the limitations of one’s own personnel. This situation is very fluid and may be different every day of the campaign. Damage control techniques that are less resource- and time-intensive can be simple things such as surgical airways, chest tubes, external and intracorporeal use of hemostatic dressings and judicious

Table 3
Reconstruction projects supported by the 250th FST in Operation Iraqi Freedom

Reconstruction project	Approximate days supported
Emergency Medical Systems of Kirkuk	26
Assist local surgeons in operative cases	77
Iraqi American Surgical Association	23
Surgical Grand Rounds	29
Hospital Site Surveys and Logistics Missions	5

packing, temporary vascular conduits, the liberal use of fasciotomies, the judicious use of amputations, and external fixation of pelvic and long bone fractures to name but a few. All of these methods were employed by the 250th at some point during the campaigns.

Evacuation of the surgical patient from the battlefield is complex but has been practiced and refined over the last century [9–11]. Combat and Special Forces medics, as well as Tri-service search and rescue teams, evacuate casualties from the field. The longer the evacuation time, the more capable the unit performing the evacuation should be. The battlefield evacuation rates, or TOT as defined by Place et al [1,8], were significantly different between the 2 campaigns, but were markedly similar to previous campaigns in their same environment (Fig. 1). The reason why the TOT was so long in Kandahar was due to the nature of the special operations environment and the limited medical assets in country—the 250th was the only surgical asset for the entire southern half of Afghanistan. This required additional and technically more advanced battlefield evacuation assets that are routinely available in the special operations sector. In OIF, although the area of responsibility of the 173rd was large initially, once involved in urban and suburban combat actions it was necessary to limit geographical area and increase troop density especially in response to the insurgency. The increased density of troops provided more internal and external medical assets and TOT was decreased, similar to that in the first Gulf War.

The FST is a prized asset that every maneuver brigade commander feels that he has to have before going into combat and is unwilling to give up even after the intense fighting has subsided. This may lead to prolonged down-

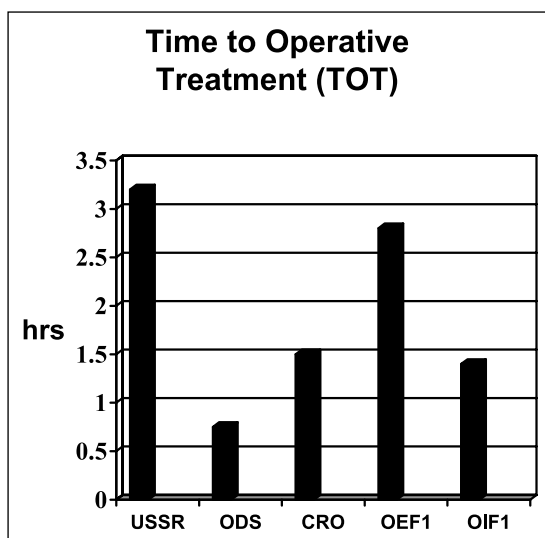


Fig. 1. Bar graph depicting battlefield evacuation times in hours of recent conflicts. USSR = Soviet experience in Afghanistan, 1980–1989 [9]; ODS = US and coalition experience in Operation Desert Storm, 1991 [11]; CRO = Croatian experience in the Balkans war, 1993–1995 [10]; OEF1 = 250th FST experience in Afghanistan, 2001–2002; OIF1 = 250th FST experience in Iraq, 2003.

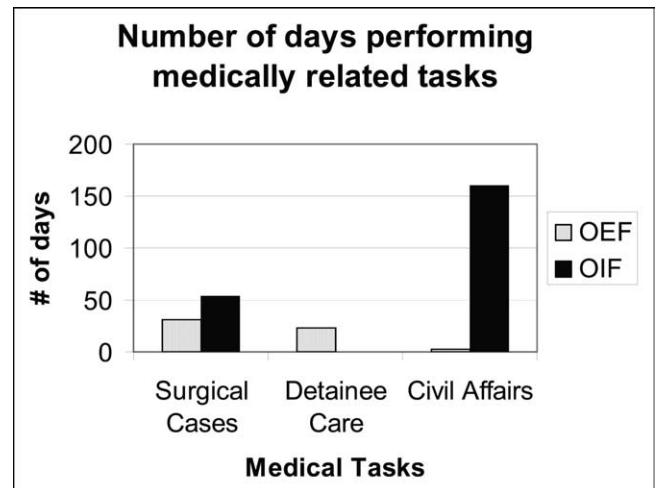


Fig. 2. Bar graph depicting the number of days in each campaign that surgeons of the 250th FST performed medical tasks. Medical tasks consisted of surgical cases and significant intensive care unit time, detainee care, and medically related civil affairs missions. OIF = Operation Iraqi Freedom; OEF = Operation Enduring Freedom in Afghanistan.

time, as many of the FSTs are currently experiencing in Iraq. Doctrinally, once intense fighting has ceased the FST is to redeploy to its higher CSH for rest and resupply [4]. This is not currently happening (unpublished data, Cohen DJ, 2004). Regardless of command and control issues, the FST commander should look for fair ways to employ his personnel in order to keep their skills refined and at the same time retain unit cohesion. Embarking on civil affairs missions as the 250th did is one way, as long as force protection standards are upheld and risk assessment is appropriately applied (Fig. 2). Rotating personnel to the busier CSH in the rear is another, especially in the nonlinear urban battlefield where rotary winged evacuation assets over-fly the less capable FST to deliver their injured to the larger combat support hospital.

Because of its mobility and flexibility, the FST can augment or be augmented by other medical units from any of the three sister services as well medical assets from other nations [12]. The 250th FST partially integrated with a US Air Force EMEDS during each of the campaigns and provided synergistic surgical support. In OIF, it was because the EMEDS hospital was co-located on Kirkuk Military Airfield that the 250th was able to send some underused personnel home. However, cooperation between medical units was hampered in several ways as well. Full integration makes moving forward or relocating with one's assigned maneuver brigade difficult especially for the losing unit. Lack of tri-service medical planning in the higher command levels often led to duplication of medical assets not only in Kandahar and Kirkuk, but over the entire theater of operations. Communication and cross-service training and education must be emphasized for future initial entry missions.

The Army Forward Surgical Team is a flexible and robust far forward surgical asset. The GWOT has been the first real test for the FST concept. While there is still

an employment learning curve for the FST, most have responded to the challenges set before them as demonstrated by the actions of the 250th and her sister FSTs cited here.

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Discussion

William Long, M.D. (Portland, OR): To the layperson, the language of the modern U.S. Military is a bewildering combination of letters, abbreviations, and code words, ever changing to meet the challenges of modern day warfare. To follow the mission, team component and effectiveness of a forward surgical team (FST) as it is assembled, staged, deployed, and interfaced with other units and local medical personnel in Iraq and Afghanistan requires for the reader, a life experience that is intimate with these matters or a faith that these military surgical teams know what they are doing.

The MASH units (Mobile Army Surgical Hospitals) as portrayed on the popular TV program, and its evolved Combat Surgical Hospital (CSH) were found to be located too far from the front in a rapidly changing battle scene with mechanized infantry, and too big to pack and relocate quickly to stay near the front.

Thus, the forward Surgical Team (FST) was created to travel with the front, to provide immediate life and limb saving surgeries to stabilize these patients before transferring them 24 hours later to a CSH further from the front lines.

Based on the data provided, the quality of the general surgeons staffing these FST's reflect the excellent surgical training military residents have received and are receiving.

In addition to the laparotomies, fasciotomies, debridements and washouts, general surgeons in both Afghanistan and Iraq performed vascular repairs, including repairs including reversed saphenous vein interposition grafts. There was only one non-brain injury fatality—exsanguination from a femoral artery and vein injuries.

In contrast to the negative popular press, this descriptive paper reports the activities of the FST's involved with civilian affairs missions in Afghanistan and Iraq. These humanitarian efforts are worthy of publication in a separate paper.